

Towards an US RD program

Or how to establish communities connected by common R&D goals

Discussion facilitated by Marina Artuso, Syracuse University

Relevant IF recommendation

Petra Merkel's contribution

IF-3 Double the US Detector R&D budget over the next five years, and modify existing funding models to enable R&D consortia along critical key technologies for the planned long term science projects, sustaining the support for such collaborations for the needed duration and scale.

This recommendation is the culmination of a decade of discussion, proposed and discussed in multiple CPAD workshops

More material for reflection from our European colleagues

Silvia Dalla Torre's presentation

c) The **success of particle physics experiments relies on innovative instrumentation and state-of-the-art infrastructures**. To prepare and realise future experimental research programmes, the community must **maintain a strong focus on instrumentation. Detector R&D programmes and associated infrastructures should be supported at CERN, national institutes, laboratories and universities**. Synergies between the needs of different scientific fields and industry should be identified and exploited to boost efficiency in the development process and increase opportunities for more technology transfer benefiting society at large. Collaborative platforms and consortia must be adequately supported to provide coherence in these R&D activities. The community should define a **global detector R&D roadmap** that **should be used to support proposals at the European and national levels**.

More inspiration

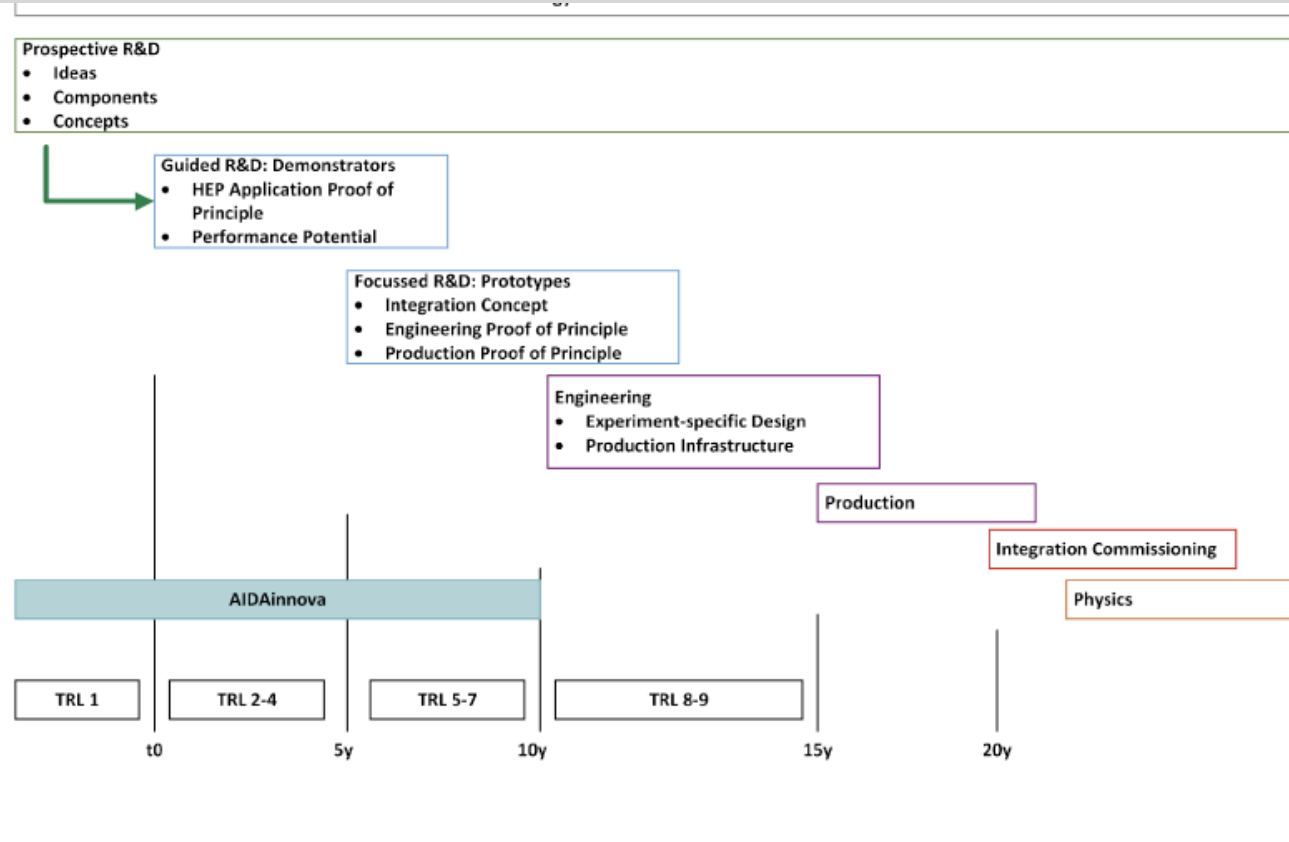
□ Paolo Giacomelli's contribution

AIDAinnova focuses on Strategic R&D in the pre-TDR phase

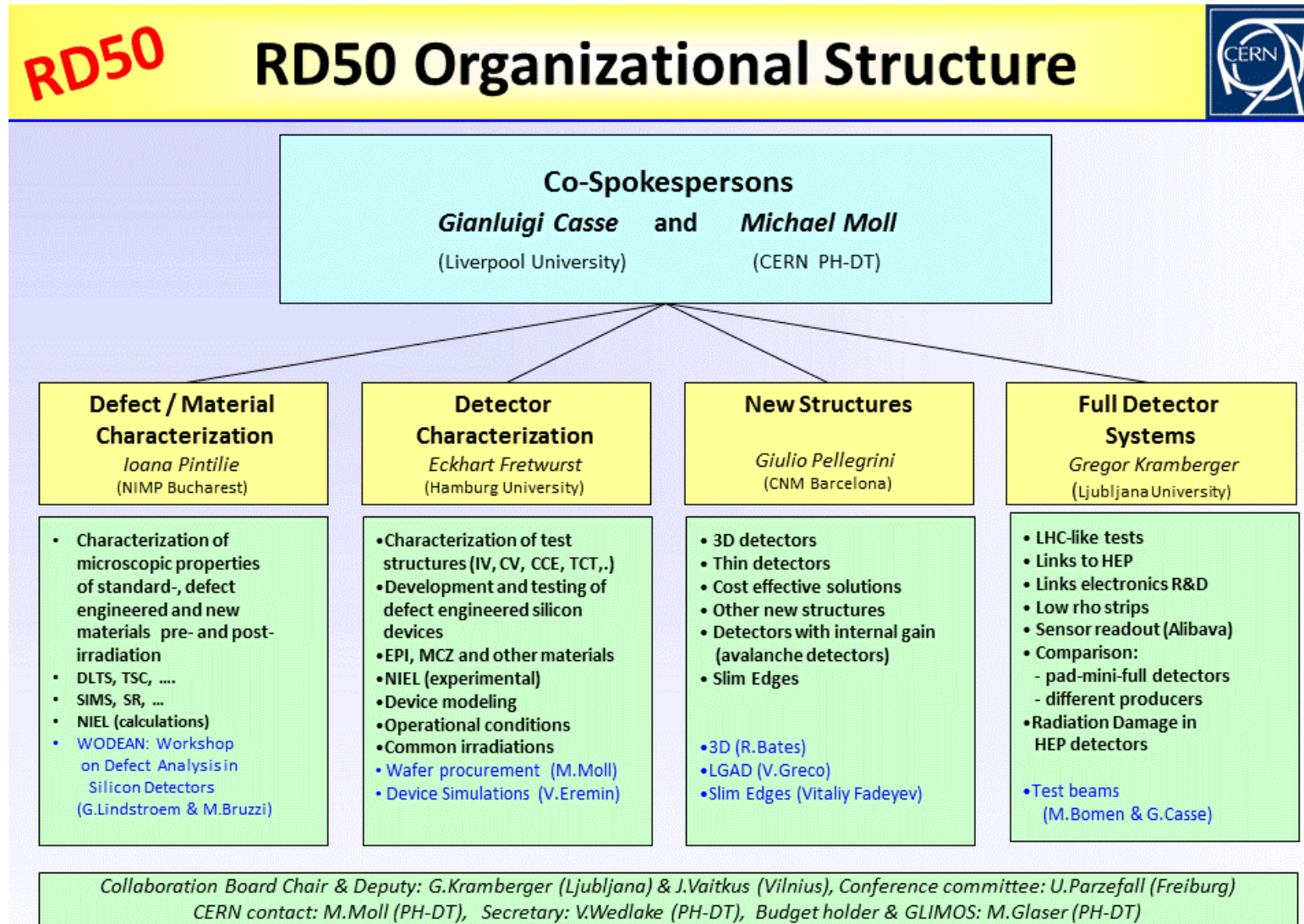
- Technology Readiness Levels 2-7
- Not yet experiment-specific: potential to unfold synergies
- Include some prospective R&D
- Competitive call at start of project
- “Blue Sky”, quantum sensors,...

Targeted applications

- Higgs Factories
- ALICE LS3, LHCb LS4 pre-TDR, ATLAS & CMS LS4
- Accelerator-based neutrino experiments



Case study – RD50



- Remarks: broad group encompassing 65 member institutions and about 20 observer institutions
- Governance shared between hosting lab and universities
- Evolving focus with attention to emerging technologies

A blueprint for action

- ❑ The Basic Research Need study for High Energy Physics has established some key research areas critical to the future of our field
 - ❑ Noble elements
 - ❑ Photodetectors
 - ❑ Quantum sensors
 - ❑ Readout and ASICs
 - ❑ Trigger and DAQ
 - ❑ Cross-cutting priority research directions
- ❑ Facilities in support of HEP are key to this program
- ❑ Nurturing new talents and supporting a workforce diverse in approach, background, and (race, gender..) identity is key to success
- ❑ Strengthening connections with industry to implement our concepts is key

Our key principles and action items

- ❑ The US Instrumentation community is poised to develop collaborative platforms that make these synergistic efforts flourish
- ❑ A creative partnership between labs and universities is key to success
- ❑ A possible model for cooperation is an “experiment status” a la CERN RDs that can promote easier flow of communication between labs and universities
- ❑ [CPAD](#) is excited to get this vibrant program to a good start
- ❑ Action items:
 - ❑ You can contribute to this community conversation by sharing your ideas at [blueprint for reinventing instrumentation R&D](#)
 - ❑ Stay tuned for opportunities to shape up the future of R&D on major initiatives to shape the future of detection techniques in experimental particle physics
 - ❑ Participate in the workshops that will be organized to launch many new initiatives

We are not throwing away our shot!

- ❑ The hard work in the BRN study and Snowmass IF has focused our community on exciting lines of investigation with the transformative power of our collective imagination.
- ❑ The moment is ripe to get together to develop the tools for a new era of discovery. Let us do it!

